

Roll.No.

20UMACT2003

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.

B.Sc Mathematics- END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - II

20UMACT2003 - Classical Algebra

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

Section B

Answer any **SIX** questions ($6 \times 5 = 30$ Marks)

1. Show that Prove that $\frac{e+1}{e-1} = \frac{\frac{1}{1!} + \frac{1}{3!} + \dots}{\frac{1}{2!} + \frac{1}{4!} + \dots}$
2. Apply the equation, increase by 7 the roots of the equation $3x^4 + 7x^3 - 15x^2 + x - 2 = 0$
3. Compute A^4 when $A = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$
4. Show that the sum of the integers less than N and prime to it including unity is $\frac{1}{2}N\phi(N)$.
5. Solve the equation $x^4 - 5x^3 + 4x^2 + 8x - 8 = 0$ one of the root is $1 - \sqrt{5}$
6. Remove the fractional coefficients from the equation $x^3 + \frac{1}{4}x^2 - \frac{1}{16}x + \frac{1}{72} = 0$
7. Show that the product of two orthogonal matrices is orthogonal
8. Examine the 8^{th} power of any number is of the form $17m$ or $17m \pm 1$.

Section C

Answer any **THREE** questions ($3 \times 10 = 30$ Marks)

9. Show that $\frac{5}{1.2.3} + \frac{7}{3.4.5} + \frac{9}{5.6.7} + \dots \infty = 3 \log 2 - 1$.
10. Solve the equation $81x^3 - 18x^2 - 36x + 8 = 0$ whose roots are in harmonic progression.
11. Solve the equation $6x^6 - 35x^5 + 56x^4 - 56x^2 + 35x - 6 = 0$
12. Compute the characteristic equation of the matrix $A = \begin{bmatrix} 2 & 2 & 0 \\ 2 & 1 & 1 \\ -7 & 2 & -3 \end{bmatrix}$ and determine its inverse.
13. If p is a prime number, deduce then $(p-1)! + 1$ is divisible by p
